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Mathematics And Mathematics Education Values In Forming Someone's Character

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Abstract

The success of someone' life is not only determined by intellectual aspect, but also other aspects, such as character, emotional, and social aspects. Those three aspects can't be separated from moral values. Moral values are concepts of basic behavior and attitude which determine who we are, how we live, and how we behave to others. Mathematics and mathematics education characteristic can become a means to make them become true. From this view, it is very interesting to know further between mathematics and mathematics education values with the problems of life, that is character.

Keywords: Mathematics value, mathematics education value, character.

A. INTRODUCTION

Before I say many things related to mathematics values and mathematics education, it is necessary to see something related to education in general. It is necessary to realize that the world of education is not immune to the effect of globalization. Globalization era is full of tight competition, and it must be faced well and wisely. It is not denied that globalization can give some advantages to anybody, but on the other hand, it can also spread any values that might be inappropriate to the values we believe, including moral values.

Then, the government through the education curriculum in the year of 2006 (famous for Kurikulum Tingkat Satuan Pendidikan) has been maintained the general aims of basic educations, they are SD (elementary school), SMP (junior high school), SMA (senior high school) and SMK (vocational school). The general aims are: (1) the aim of basic education is to place the basic of cleverness, knowledge, character, good moral and also skill to live independent and follow the next higher education, (2) the aim of middle education is to increase the cleverness, knowledge, character, good moral and also skill to live independent and follow the next higher education, (3) the aim of vocational education is to increase the cleverness, knowledge, character, good moral

and also skill to live independent and follow the next higher education related to its vocation.

By seeing those general aims, it is always mentioned that education has an aim to increase character and good moral, in every kinds of education. Therefore, this aim can become the basic of every institution or education level must emphasize on value education that can contribute to the form of character and good moral. So that, it becomes our responsibility to fortify our young generation from any values that are not appropriate to the moral value we believe. It also becomes the responsibility for mathematics lecturers or teachers to use the mathematics vehicle in building the moral value to face the problems in life.

So, from the explanation above, the main problem of this paper is: 1) What things belong to moral values? 2) How to integrate mathematics value and mathematics education to form someone's character?

B. DISCUSSION

Value

Value is something that is very difficult to define clearly. Moral values are concept of basic behavior and attitude which determine who we are, how we live, and how we behave to others. Those values can be divided into two: 1) values of being, consists of honest, bravery, love of peace, self-confidence, discipline, and purity (of heart), 2) values of giving, consists of loyalty, honor, love, not selfish, familiar, and fair. This statement can explain about value. Fraenkel (1977) as cited by Swadener and Soedjadi (1988) define value as follows:

"A value is an idea – a concept about someone thinks is important in life."

"Values are ideas about the worth of thinking, they are concepts, abstractions."

So, a value can be seen as a concept of anything that is important in life and also as a clearness of thinking. Value can be in one's heart, consists of ideas, thinking of a clearness of thinking that is important in one's life. While Swadener and Soedjadi (1988) said that value could be categorized into esthetic values and ethical values. Esthetic value relates to beauty objects, while ethic values relates to objects that can be thought as good or bad behavior. Then, Swadener and Soedjadi (1988) said that values could be descended upon cultural values, practical values, educational values, and

historical values. Linda & Eyre (1997) gave the limitation of value is a standard behavior and attitude to determine who we are, how we live, and how we behave to others. Values can be any values that are good and bad and relates to the beauty, and can also be descended upon cultural values, practical values, educational values, and historical values.

Moral Values

Linda & Eyre (1997) explained that moral values are behaviors that were convinced by many people as good things and had been proven not to make problems to others. Clearly, moral values are values that can make someone else become happy. While moral actions are actions that after someone did them, he could feel good, and vice versa.

Then, Linda and Eyre (1997) explained that moral values could be classified into two: values of being and values of giving. Values of being consist of honest, bravery, love of peace, self-confidence, discipline, and purity. While values of giving consist of loyalty, honor, love, not selfish, friendly, and fair.

From the above explanation, it can be concluded that moral values are the important concepts in life that become valuable thought as a standard of behavior and attitude. These values are convinced by many people as good things and not become problems to others.

Mathematics Values and Mathematics Education

Before we talk further about mathematics value and mathematics education, it is important to know little about "what mathematics is" and "what mathematics characteristics are". The definitions of mathematics are many. Many definitions and various understanding about mathematics, and nothing had been agreed by all mathematics experts. Below, there are some definitions about mathematics:

a. Mathematics is a branch of exact knowledge and being organized systematically.
b. Mathematics is a knowledge of numbers and calculation
c. Mathematics is a knowledge of logical thinking and relates to numbers

d. Mathematics is a knowledge of quantitative facts and problems of volumes and shapes
e. Mathematics is a knowledge of logical structures
f. Mathematics is a knowledge of strict rules

From those above definitions, it can be seen that there are specific characteristics which can resume about the understanding of mathematics in general. Some of the mathematics characteristics are: (a) having an abstract study object, (b) relying on the agreement, (c) deductive thinking system, (d) having meaningless symbol, (e) paying attention to whole speech, (f) being consistent in its system.

In mathematics, the learnt basic object is abstract, and it is often called mental object. The objects can be thinking objects that consist of: (1) facts, (2) concepts, (3) operation or relation, and (4) principles. From those basic objects, we can arrange a pattern and mathematics structure.

Facts can be some conventions revealed by certain symbols. For example, the symbol of number "3" can be generally understood as a number of "three". Concept is abstract idea that can be used to classify a group of objects whether the certain objects become an example of concept or not. Take an example, "triangles" is a name of an abstract concept. With that concept, a group of objects can be classified into the example of triangles or not. Operation is a rule to get one element from one or many elements, such as calculating, algebra, and other mathematics operation. For example, "addition", "multiplication", "union", "section". The operated elements are also abstract. Principle is complex mathematics objects. Principle can consist of some facts, some concepts connected to one relation or even operation. Simply, it can be said that principle is a relation between some mathematics basic objects. Principle can be as "axiom", "theorem", "characteristics", and so on.

Like in our daily life, including life to nation and country, there are many agreements that tight to all citizens. In mathematics, agreement is a very important support. The very basic agreements are axiom and primitive concept. Axiom is needed to avoid unnecessary of improving, while primitive concept is needed to avoid unnecessary in making definition. Axiom is also now called postulate or main point of statement (it is often stated but no need to prove). Primitive concept is also called as undefined term or main point of understanding that does not need to define: some

axioms can form one system of axiom, then it can decrease some theorem. In one axiom, of course, there is a certain primitive concept. From one or more primitive concepts can be formed new concepts through defining.

Mathematics as a "knowledge" is only accepted based on deductive thinking pattern. Deductive thinking pattern can be said as thought "starting from general and is applied to specific one". This deductive thinking pattern can be formed in a very simple way but the form is not so simple.

In mathematics, it can be seen clearly that there are many symbols used, both letters and non letters. The series of symbols in mathematics can form a mathematics model. This model can be equation, non equation, certain geometric structure, and so on. The letters used in mathematics, for example x + y = z does not always have a meaning of numbers. The symbol of "+" doesn't always mean an additional operation to those two numbers. The meaning of letters and numbers is based on the problems that can cause that model. So, in general, letters and sign in the model of x + y = z has no meaning, it's all up to anybody who would like to use that model. The zero meaning in symbols as well as in signs in mathematics models can make an "intervention" of mathematics to other knowledge. It is also possible to come to linguistics.

Related to zero meaning of the symbols and signs, it shows us clearly that it needs clarity of the field, in what model it is used. If the speaking area is about numbers, so the symbols is meant numbers. If it is about transformation, so the symbols is also meant as a transformation. This is what we call it by univers set. The right or wrong, or there is or there is not any solution in one model is determined by whole speech.

What we explained above is being a short view of mathematics. Mathematics education is related to the students who are being in the process of cognitive and emotional development of each. The need steps of studying in accordance to their development of soul and cognitive. The student potencies develop from "low to high rank" from "simple to complex". So, mathematics education is also called part of mathematics chosen for the education needs.

In mathematics, there is a freedom in arranging the definition, take an example definition of triangles, that is a triangle having same length of side. That definition can also mean a triangle that those three angles are same. The two definitions are statements

that limit the concept. This experience can be used as a process of learning (tends to democracy value).

Because mathematics value always relates to mathematics characteristics, so it has some values such as: the values of agreement, freedom, consistency, whole speech, and obedience. Value of agreement can be reached from defining the concept. Although one concept can be defined into many ways, the agreement determines which definition will be used. After that, other definitions can become some theorem. The value of freedom can be seen from the symbols that have no meaning. By having no meaning, mathematics can give any meaning to the symbols freely. Finally, mathematics can also interfere to other knowledge well. The value of consistency can be reached from its deductive of mathematics. The truth of mathematics can be shown by using the truth that is proven before.

If we pay attention to characters one by one, including to the effect on mathematics structure, it is not difficult to understand that characteristics are also very important in the daily life. If this characteristic is used consciously as a means of education, it is clear to have education value that can lead the students to be discipline or obey to the agreement. The freedom in making definition can be used in mathematics learning as a means of being democratic. In such position, mathematics has a function as a vehicle to reach the goal of education.

From the explanation above, there are similarities as well as differences between mathematics and mathematics education. There are some mathematics education characteristics, such as follows: (a) having abstract and non abstract studying objects, (b) relying on the agreement, (c) having deductive and inductive thinking pattern, (d) being consistent in their systems, (e) having/using meaningless symbol and also having certain meaning, (f) paying attention to whole speaking.

Values in mathematics education can include the values of: cooperation, freedom, discipline, accuracy, accepting the opinion, respect, and understanding. According to Sheah and Bishop (2000) as cited by Dede (2006), mathematics education can include: clarity, conjecturing, consistency, creativity, effective organization, efficient working, enjoyment, flexibility, open mindedness, persistence, and systematic working.

The combination between mathematics value and mathematics education value can produce life values, they are: collaboration, negotiation, communication, solving problems, positive attitude, awareness, emphatic and independence, honesty, bravery, love of peace, self-confidence, discipline, and respect to other opinion.

Ernest and Chap Sam (2004) classified the values based on the existence of value in students. They are the values of epistemology, social and culture and also personal. Epistemology value involves skill, appraisal and the characteristic of mathematics education. The value of social culture is a value that support social group and the one who cares the individual task to the society related mathematics education, for example cooperation and appreciation toward the beauty of mathematics. While personal value is a value that treats individual as a learner and individual, such as patience, self-confidence, and creativity.

From the opinion of Sheah and Bishop and also Ernest and Chap Sam, it can be concluded that mathematics values and mathematics education include many values of: accuracy, clarity, conjecturing, consistency, creativity, effective organization, efficient working, enjoyment, systematic working, rationality, co-operation, justice and appreciation of the beauty of mathematics, patience, confidence, objectivity, control, progress, mystery, open mindedness, flexibility, persistence.

So, actually moral value has been existed in mathematics value and mathematics education, though they are not absolutely same. Some things seem as similarity, resemblance, and combination or part of values in mathematics education. From the study above, it is very possible to integrate the education of moral values in mathematics education.

Integration of Moral Value in Mathematics Education

By seeing the fact that moral values have similarity, resemblance, and combination or part of values in mathematics education, so mathematics education can be used to internalize moral values through the integration of moral values in mathematics education. Actually, integration of moral value in education is a difficult job. Sanjaya (2006) said that values are abstract and hidden things inside the one, and they are difficult to measure. They can be emotional problems that can change and develop as the effect of changing and developing of someone's environment. Therefore,

it doesn't mean that moral value integration is impossible to do by mathematics education.

Actually, value education is a process of attitude forming inside the students. So, there are many ways to do, to internalize the value inside the students in the integrated process in learning. In order to form the characteristic and attitude in learning, internalization of mathematics value and mathematics education can be done by having habitual pattern and modeling pattern.

Habitual pattern is done by repeating the values that would be internalized into the students many times, so it will create gradually the values that must be done in the society. Next, that value will always be held till the big changing happen in the development of environment that effect to the values, if not, the values will always be in them.

Modeling pattern is done by giving some examples as a model. Teacher should be able to motivate students to imitate the presented model, so it will gradually create the values of truth and kindness. By this pattern, the model of imitating behavior can develop well to implant the individual value. Modeling pattern is usually insisted the teachers to behave as good as the model. In this case, teachers do not only teach the materials but they also become models in implementing the values that are internalized to the students in that teaching-learning process.

Habitual pattern and modeling pattern are necessary to plan well through the formulae of instructional goal completed by affective and psychomotoric goals as what Soedjadi (1999) said by the terms of value learning by design. Shortly, it can be said that the choosing of materials must be appropriate to the purpose of students according to their strata and types of school. The appropriateness of the materials will be very useful for the students to learn. If the appropriateness can be fulfilled, the students can have values for their abilities and skills.

The Integration of Moral Value in Mathematics Education through Cooperative Learning in Small Group

When moral values that would like to internalize had been being reached, the students will feel satisfied and realize them about the beauty of mathematics. So that the method of cooperative learning in small group will possibly make the students to

increase their love to mathematics, increase the understanding of mathematics concept and its implementation. When students feel the beauty of mathematics and love mathematics, they can increase students' interest to study hard. Finally, the student mathematics concept mastering is getting better and better. Last but not least, mathematics learning becomes interesting by cooperative learning in small group.

The following will be presented an example of learning activities that contain some values of life. The example is parallelogram material for junior high school students. This learning uses cooperative learning in small group with the process of enactive-iconic-symbolic from Jerome Bruner.

1. Students are faced to an ABC paper triangles. With the middle point in one of the sides, (for example P point in the middle of side AC), students are asked to rotate the ABC triangles in the same direction to the clock for 180^0. If the triangles is in the end position to draw, so there will be a square that is called parallelogram, namely ABCB.
2. Students are asked to observe their work, and find out the same sides and same angles as the result of that rotation. The finding of each group must be written.
3. Based on the finding of each student or group, student is asked to make definition with the teacher's help, for example: "a Parallelogram is a square which …."
4. There will be some definitions, of course, according to the finding of the student or group.
5. After that, the teacher try to see and determine which definition is right. Then, the teacher leads the students to agree one of the definitions.
6. Next, all problems about parallelogram can be handled by using that definition and other characteristics learnt by the students.

If we pay attention to the planned learning process above, it can be seen that the teacher try to implant education values on purpose, according to affective and psychomotor domains.

So, it is clear that mathematics teaching-learning process can show that democratic attitude can be formed through activities of mathematic teaching-learning process.

The moral values that can be integrated in mathematics education as the example above, consist of: (1) honesty value is internalized by the confession of other answers from other friends in group discussion or class discussion, (2) Bravery value is internalized by the student's bravery in saying the opinion, (3) love of peace value is internalized by accepting other opinions that must be, of course, true, (4) value of self confidence is internalized by the confidence that the answer is correct though it is different to others, (5) discipline is internalized by obeying the rules of the game in any level, (6) purity value is internalized by the honesty in the discussion to get the truth, (7) loyalty value is internalized by being loyal to the truth, (8) honor value is internalized by confession of the truth, (9) love value is internalized by alive discussion and respect to others, (10) not selfish- value is internalized by the mechanism of group discussion, not to dominate other groups, (11) Being fair value is internalized by the mechanism of grouping that doesn't make different to others.

It is necessary to do these in continuity through habitual process, so that mathematics can become the vehicle to that process. Another one is modeling. In this case, teachers/lecturers are insisted to be models and give moral values. They are values of being and values of giving.

C. Closing

It is concluded that moral values consist of fair attitude, not selfish, love, honor, loyalty, purity, discipline, self confidence, bravery and honesty. Mathematics value consists of the values of agreement, freedom, consistency, and the whole speech and also obedience. The values in mathematics education can consist of the values of: cooperation, freedom, discipline, accuracy, accepting other opinions, respects, and understanding.

The combination of mathematics value and mathematics education value can produce some values in our daily life, such as: collaboration, negotiation, communication, solving problems, positive attitude, awareness, emphatic, independence, honesty, bravery, love of peace, self confidence, discipline and respect to other opinions. Learning values in cooperative learning in small groups can be done continuity by habit and modeling to produce internalization of moral values inside the students.

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